

1/12

FIG. 1A

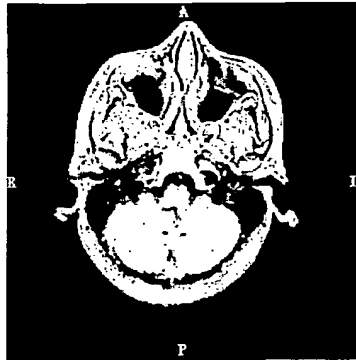
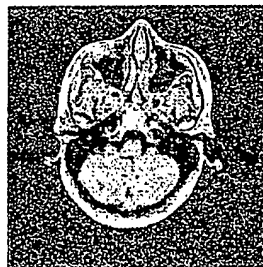


FIG. 1B



2/12

FIG. 2

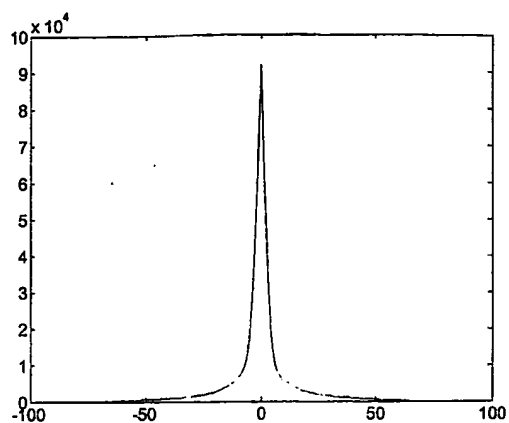
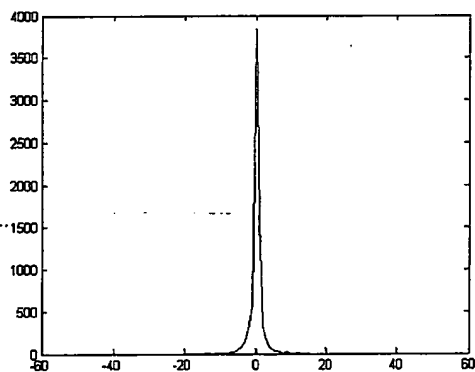


FIG. 3



3/12

FIG. 4

$$\begin{pmatrix} 0 & 0 & 0 & \cdots & 0 & 0 & 0 \\ 0 & 1 & 1 & \cdots & 1 & 1 & 0 \\ 0 & 1 & 1 & \cdots & 1 & 1 & 0 \\ \vdots & \vdots & \vdots & & \vdots & \vdots & \vdots \\ 0 & 1 & 1 & \cdots & 1 & 1 & 0 \\ 0 & 1 & 1 & \cdots & 1 & 1 & 0 \\ 0 & 0 & 0 & \cdots & 0 & 0 & 0 \end{pmatrix}$$

FIG. 5A

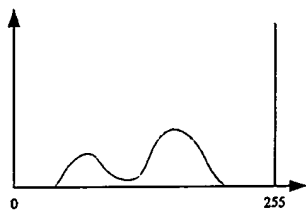


FIG 5B

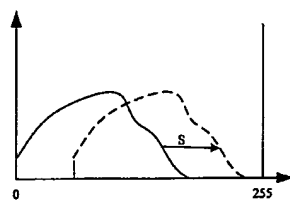


FIG. 5C

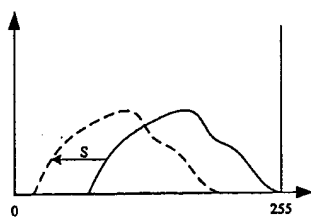
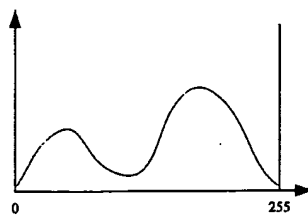


FIG. 5D



4/12

FIG. 6

5/3 FILTER COEFFICIENTS

	Analysis Filter		Synthesis Filter	
	Coefficients		Coefficients	
i	Low-pass Filter $h_L(i)$	High-pass Filter $h_H(i)$	Low-pass Filter $g_L(i)$	High-pass Filter $g_H(i)$
0	6/8	1	1	6/8
± 1	2/8	-1/2	1/2	-2/8
± 2	-1/8	0	0	-1/8

FIG. 7

$$G_{HL} = \begin{bmatrix} \frac{1}{16} & \frac{1}{8} & \frac{3}{8} & \frac{1}{8} & \frac{1}{16} \\ \frac{1}{8} & \frac{2}{8} & \frac{6}{8} & \frac{2}{8} & \frac{1}{8} \\ \frac{1}{16} & \frac{1}{8} & \frac{3}{8} & \frac{1}{8} & \frac{1}{16} \end{bmatrix}$$

5/12

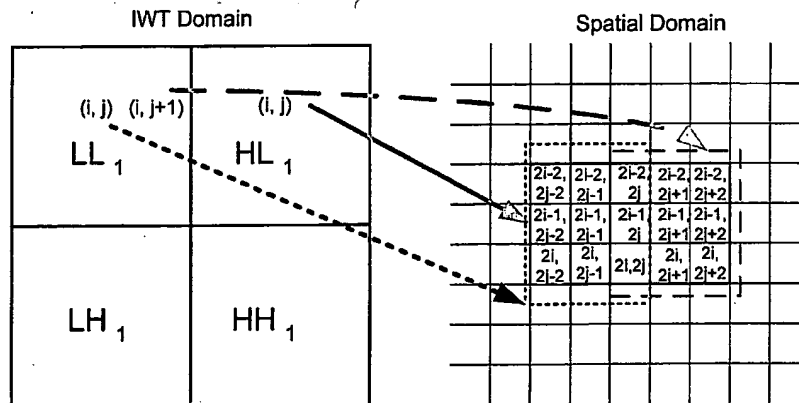
FIG. 8

$$G_{LH} = \begin{bmatrix} \frac{1}{16} & \frac{1}{8} & \frac{1}{16} \\ \frac{1}{8} & \frac{2}{8} & \frac{1}{8} \\ \frac{3}{8} & \frac{6}{8} & \frac{3}{8} \\ \frac{1}{8} & \frac{2}{8} & \frac{1}{8} \\ \frac{1}{16} & \frac{1}{8} & \frac{1}{16} \end{bmatrix}$$

FIG. 9

$$G_{LL} = \begin{bmatrix} \frac{1}{4} & \frac{1}{2} & \frac{1}{4} \\ \frac{1}{2} & 1 & \frac{1}{2} \\ \frac{1}{4} & \frac{1}{2} & \frac{1}{4} \end{bmatrix}$$

FIG. 10

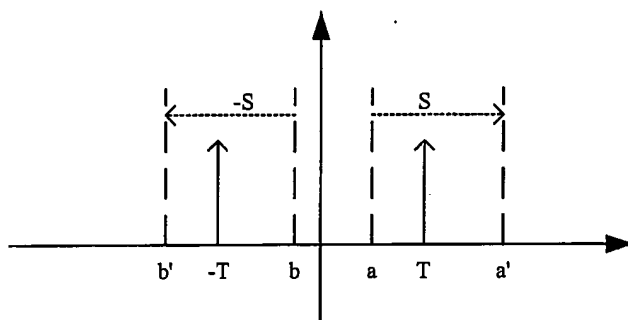


6/12

FIG. 11

$$R = \begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

FIG. 12



7/12

FIG 13

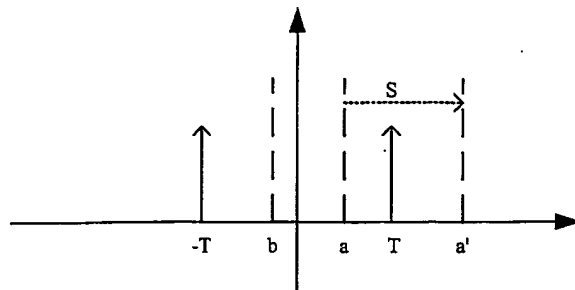
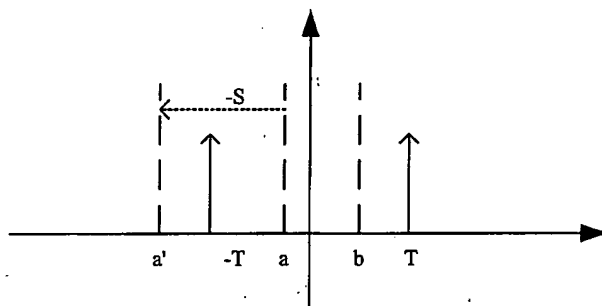
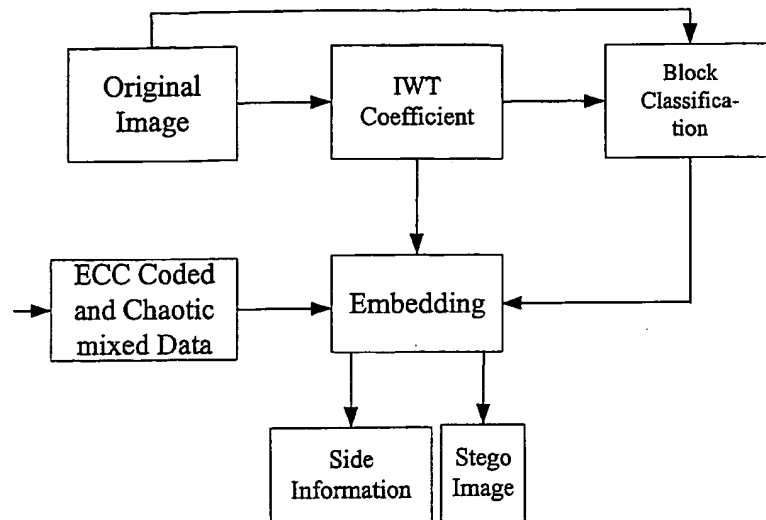


FIG. 14



8/12

FIG. 15



9/12

FIG. 16

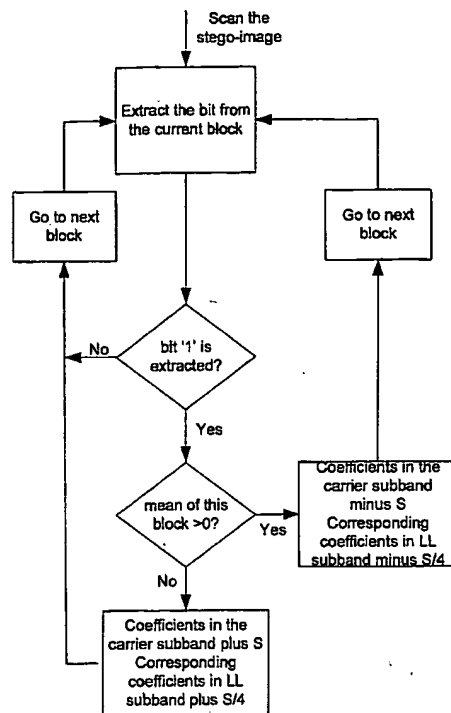


FIG. 17

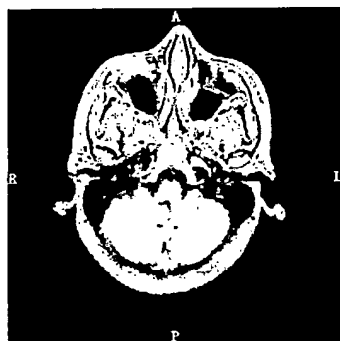


FIG. 18



10/12

FIG. 19

Block size	ECC Scheme	Capacity with ECC (bits)	Capacity without ECC (bits)
5	(15,11)	1907	2601
6	(15,11)	1293	1764
7	(15,11)	950	1296
8	(15,11)	750	1024
9	(15,11)	574	784
10	(15,11)	458	625
11	(15,11)	387	529
12	(15,11)	323	441

FIG. 20

Block size	m_{max} in HL_1	m_{max} in LH_1	Minimum shift values	PSNR (dB)
5	16.56	7.78	8	40.09
6	10.25	4.56	6	41.87
7	9.64	2.72	4	44.81
8	6.14	2.64	4	44.36
9	4.31	2.63	4	44.18
10	4.00	1.84	2	49.86
11	3.41	1.69	2	49.62
12	3.18	1.55	2	49.46

FIG. 21



FIG. 22

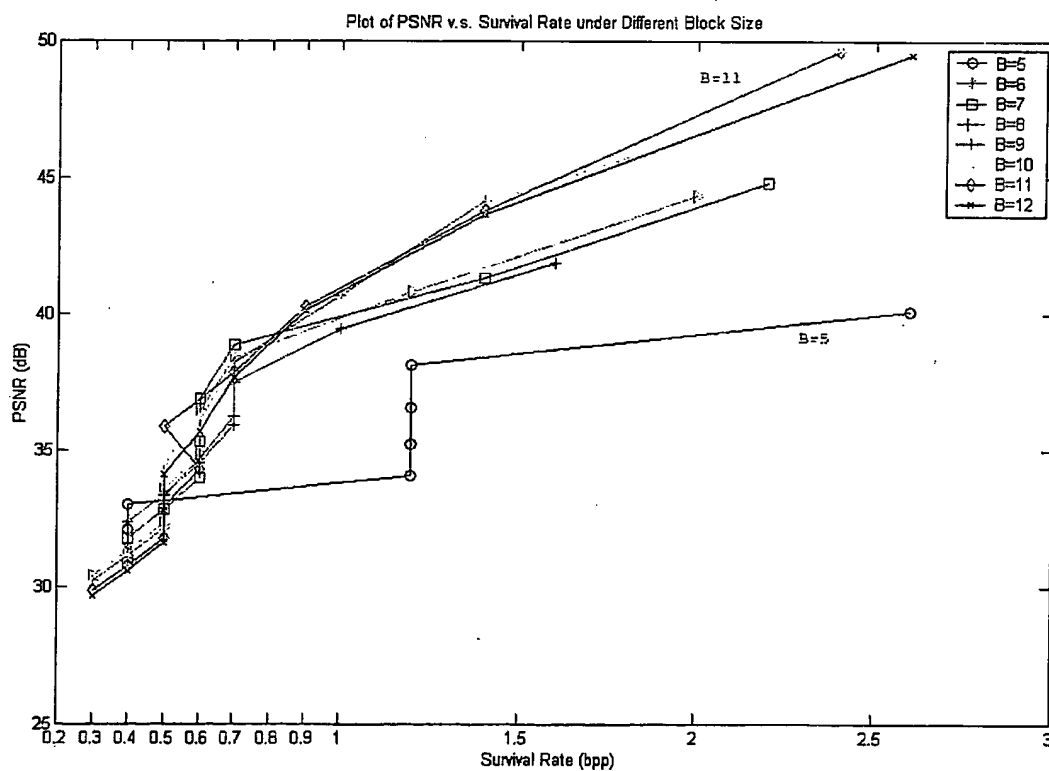


11/12

FIG. 23

PSNR(dB)		Block Size							
		5	6	7	8	9	10	11	12
Shift Value	2	-	-	-	-	-	49.86	49.62	49.46
	4	-	-	44.81	44.36	44.18	44.08	43.80	43.63
	6	-	41.87	41.30	40.84	40.67	40.55	40.28	40.12
	8	40.09	39.44	38.85	38.39	38.20	38.10	37.83	37.66
	10	38.14	37.48	36.89	36.43	36.26	36.15	35.88	35.71
	12	36.57	35.91	35.32	34.86	34.68	34.57	34.30	34.14
	14	35.23	34.57	33.98	33.52	33.34	33.23	32.96	32.79
	16	34.08	33.42	32.83	32.37	32.18	32.08	31.81	31.64
	18	33.05	32.38	31.80	31.34	31.16	31.05	30.78	30.61
	20	32.13	31.47	30.89	30.43	30.24	30.15	29.86	29.70

FIG. 24



12/12

FIG. 25

Decoded error bits		Block Size							
		5	6	7	8	9	10	11	12
Shift Value	2	-	-	-	-	-	228	197	164
	4	-	-	477	383	291	228	197	164
	6	-	643	474	381	275	167	154	131
	8	940	643	359	262	203	91	70	78
	10	940	616	237	160	136	50	37	10
	12	940	485	129	89	79	13	7	0
	14	940	398	82	32	35	0	0	0
	16	940	269	40	14	16	0	0	0
	18	938	199	28	2	11	0	0	0
	20	747	128	11	1	10	0	0	0

FIG. 26

Decoded error bits		Block Size							
		5	6	7	8	9	10	11	12
Shift Value	2	-	-	-	-	-	140	137	121
	4	-	-	200	120	46	27	10	0
	6	-	313	111	32	8	4	0	0
	8	657	236	87	18	3	0	0	0
	10	312	159	19	9	0	0	0	0
	12	46	28	4	2	0	0	0	0
	14	14	6	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0